

nomenon lasted 30 minutes. Barnegat, N. J., 18th, 4 miles below station, moving southeastward across the bay.

*High Tides.*—Indianola, 1st, 8th; Norfolk, 5th; New London, 26th; New Haven, 29th.

## TEMPERATURE OF WATER.

*The temperature of water*, as observed in rivers and harbors at Signal Service stations, with the average depth at which observations were taken, is given in the table on the left-hand side of chart No. III. Owing to the breakage of instrument, observations at Charleston, S. C., wanting from the 1st to 7th.

## ATMOSPHERIC ELECTRICITY.

*Thunder Storms.*—In the various districts they were reported as follows: New England, 3d, 17th, 18th; Middle Atlantic states, 1st, 17th, 18th, 30th, 31st; South Atlantic states, 17th, 18th, 19th, 30th, 31st; East Gulf states, 1st, 16th, 18th, 19th, 23d, 29th, 30th; West Gulf states, 4th, 11th, 15th, 17th, 23d, 26th, 27th, 29th; Rio Grande valley, 22d, 23d, 26th; Ohio valley and Tennessee, 2d, 3d, 4th, 8th, 9th, 13th, 15th to 19th, 28th to 30th; Lower Lake region, 2d, 8th, 15th, 17th, 27th; Upper Lake region, 1st, 6th to 8th, 12th, 14th, 15th, 17th, 28th, 29th; extreme Northwest, 10th, 11th; Upper Mississippi valley, 3d, 4th, 7th, 8th, 11th, 13th to 16th, 19th, 21st, 27th, 28th; Missouri valley, 1st to 4th, 8th to 18th, 21st to 23d, 27th to 30th; Northern Slope, 10th, 16th; Middle Slope, 8th, 11th, 12th, 14th to 16th, 21st, 22d, 26th, 27th; Southern Slope, 3d, 12th, 13th, 16th to 18th, 22d, 26th; Southern Plateau, 3d to 8th, 12th to 15th, 18th, 21st, 23d, 24th; Middle Plateau, 10th, 25th; Northern Plateau, 6th.

*Auroras.*—The most general display was that of the night of the 16th and 17th, which was observed from Sydney, N. S., westward to Ft. Sisseton, Dak., and as far south as Freehold, N. J., 17 intervening stations reporting. The display was not a very remarkable one, many of the features usually observed being absent. The display of the 18th was exclusively observed in the Lake region being reported by the following stations: Marquette, 18th, from 10.10 to 11.15 p. m.; Mission House, Wis., 18th, from 9 to 11 p. m., faintly illumined arch, with dark cloud underneath; Alpena, Mich., 18th, 9.10 p. m., diffuse light without streamers; Toronto, 18th. Other displays were reported as follows: Charlottetown, P. E. I., 20th, 21st, 27th. Fredericton, N. B., 7th, 19th, 27th. Dexter, Me., 19th, faint. Mt. Washington, 19th, from 11.22 p. m., to early morning of 20th, faint light. Burlington, Vt., 19th, from 11 to 11.45 p. m., faint; 20th, 11 to 11.30 p. m., faint; 26th, 11 to 11.40 p. m., faint; 27th, 11 to 11.45 p. m. A noteworthy feature of the display of the 27th was its nearness to the horizon; the dark segment was about 2° above the horizon; dancers and streamers were observed, the latter shooting up to a height of 25°; the general color was a faint yellowish light, but that of the dancers was a pale green. Woodstock, Vt., 19th. South Lee, Mass., 29th, p. m. Eastport, Me., 27th, 10 p. m. to midnight; extended from NW. to NE. and to an altitude of 15°; at 11 p. m. numerous beams appeared, all radiating from the same magnetic point, resembling rays of light from the sun, such as are sometimes seen after sunset; their color was a bright yellow. Newport, R. I., 3d, 7 to 9 p. m. Toronto, 20th, 26th. Alpena, 20th, 8.40 p. m., faint yellow light, with an occasional streamer; ended at 1 a. m. of 21st. Marquette, 20th, 9.50 p. m.; very brilliant at 10.40 p. m., when beams began to shoot up to a height of 30°; the entire northern heavens was illuminated; disappeared at 11.40 p. m. Escanaba, 8th, 9.15 to 9.35 p. m., a few streamers pointing toward zenith; 20th, 10.05 to 11.30 p. m., consisting of beams of pale yellow, having a wavy motion from E. to W. Ft. Snelling, Minn., 31st, 5 a. m. St. Vincent, Minn., 19th, 9 p. m., low down in the north; was bright, sending up many streamers until midnight; 20th, from 8 to 10 p. m., consisting of an arch of about 15° in height, with dark segment; a few streamers and folds; 27th, from 8 to 10 p. m., about 20° in height; was partially obscured. Riley, Ill., 21st, a mere northern twilight; altitude about 12°. Keokuk, 12th, aurora probable; clouds unusually bright in the northern sky from an altitude of 8° to zenith; earth currents interrupted telegraphic communication. New Corydon, Ind., 19th, 2 a. m., strong auroral light; 22d, 2 a. m., strong auroral light.

*Atmospheric Electricity Interfering with Telegraphic Communication.*—Silver City, N. M., 3d; Stockton, Tex., 12th, 16th, 17th.

*Zodiacal Light.*—Monticello, Ia., 25th; Des Moines, Ia., 4th; Cambridge, Mass., suspected, 11th, 14th, 26th; Nashville, Tenn., 1st, 2nd, 3rd. New Corydon, Ind., 20th to 23d, 25th to 27th.

## OPTICAL PHENOMENA.

*Lunar halos* have been observed in the various districts on the following dates: New England, 3d, 5th, 6th, 7th, 28th, 30th, 31st; Middle Atlantic states, 2d, 3d, 6th, 7th, 9th, 12th, 28th; South Atlantic states, 2d, 6th, 7th, 9th, 29th, 30th; East Gulf states, 2d, 7th, 8th; West Gulf states, 2d, 3d, 4th, 10th, 28th to 31st; Rio Grande valley, 3d, 5th, 6th, 27th; Ohio valley and Tennessee, 2d, 3d, 7th, 8th, 9th, 11th, 17th, 22d, 27th, 29th, 30th; Lower Lake region, 6th, 7th, 11th, 12th, 28th, 30th, 31st; Upper Lake region, 5th to 11th, 30th, 31st; extreme Northwest, 2d, 9th; Upper Mississippi valley, 2d, 3d, 6th, 8th, 9th, 29th to 31st; Missouri valley, 2d, 3d, 4th, 6th, 12th, 29th, 31st; Northern Slope, 6th, 15th, 28th, 30th; Middle Slope, 1st, 6th, 8th; Southern Plateau, 2d, 27th to 30th; Middle Plateau, 6th, 28th; Northern Plateau, 7th, 8th, 31st; North Pacific region, 14th; Middle Pacific region, 11th, 18th, 28th; South Pacific region, 2d.